

Warm Up # 5-5

1. Write in vertex form, state vertex, find intercepts and accurately sketch the graph.

$$y = 2x^2 + 12x + 10$$

Staple and turn in

Classwork Week 5

Warm up on top

Blue WS (p. 59 & 62)

HW Questions: p. 337

2.

f_o	f_e	$f_o - f_e$	$(f_o - f_e)^2$	$\frac{(f_o - f_e)^2}{f_e}$
24	30	-6	36	1.2
26	20	6	36	1.8
36	30	6	36	1.2
14	20	-6	36	1.8
			<i>Total</i>	6

3a ii)

f_o	f_e	$f_o - f_e$	$(f_o - f_e)^2$	$\frac{(f_o - f_e)^2}{f_e}$
21	14.56	6.44	41.4736	≈ 2.85
5	11.44	-6.44	"	≈ 3.63
7	13.44	-6.44	"	≈ 3.09
17	10.56	6.44	"	≈ 3.93
			<i>Total</i>	≈ 13.5

3b ii)

f_o	f_e	$f_o - f_e$	$(f_o - f_e)^2$	$\frac{(f_o - f_e)^2}{f_e}$
19	16	3	9	0.563
12	14	-2	4	0.286
9	10	-1	1	0.1
14	14	-3	9	0.0625
128	126	2	4	0.0317
91	90	1		0.011
			<i>Total</i>	<u>1.05</u>

$$\chi^2 = \sum \frac{(f_o - f_e)^2}{f_e}$$

REVIEW SET 10A

- 2** The contents of cans of a certain brand of soft drink are normally distributed with mean 377 mL and standard deviation 4.2 mL.
- a** Find the percentage of cans with contents:
 - i** less than 368.6 mL
 - ii** between 372.8 mL and 389.6 mL.
 - b** Find the probability that a randomly selected can has contents between 377 mL and 381.2 mL.

- 6** Let X be the weight in grams of bags of sugar filled by a machine. Bags less than 500 grams are considered underweight. Suppose that $X \sim N(503, 2^2)$.
- a** What proportion of bags are underweight?
 - b** Bags weighing more than 507 grams are considered overweight. If the machine fills 6000 bags in one day, how many bags would you expect to be overweight?
- 7** In a competition to see who could hold their breath underwater the longest, the times were normally distributed with a mean of 150 seconds and standard deviation 12 seconds. The top 15% of contestants go through to the finals. What time is required to advance to the finals?

REVIEW SET 10B

- 1 State the probability that a randomly selected, normally distributed value lies between:
 - a σ above the mean and 2σ above the mean
 - b the mean and σ above the mean.
- 2 A random variable X is normally distributed with mean 20.5 and standard deviation 4.3. Find:
 - a $P(X \geq 22)$
 - b $P(18 \leq X \leq 22)$
 - c k such that $P(X \leq k) = 0.3$.

We have been calculating X^2 using expected values we got from assuming the 2 variables are Independent.

Today we will use our calculated X^2 value to either reject or support our Null Hypothesis, H_0 , which stated that the variables are Independent.

DEGREES OF FREEDOM : The number of values that are free to vary

Contingency table:

	A_1	A_2	sum
B_1	9	3	12
B_2	6	2	8
sum	15	5	20

The value in the top left corner is free to vary, as it can take many possible values, one of which is 9. However, once we set this value, the remaining values are *not* free to vary, as they are determined by the row and column sums.

$$df = (\# \text{ of rows} - 1)(\# \text{ columns} - 1)$$

$$df = (2 - 1)(2 - 1)$$

$$df = 1 \text{ (for any 2X2 table)}$$

For a 3X3 table:

	C_1	C_2	C_3	sum
D_1	5	3	4	12
D_2	2	4	2	8
D_3	6	2	5	13
sum	13	9	11	33

$$df = (3 - 1)(3 - 1)$$

$df = 4$ values that are free to vary, the rest will be found by subtraction so they will not vary.

SIGNIFICANCE LEVEL

As the χ^2 value gets larger, it becomes increasingly unlikely that the variables involved are independent.

The **significance level** indicates the minimum acceptable probability that the variables are independent.

The commonly used Significance Levels are 1%, 5%, and 10%

When $X^2 >$ the value determined by the significance level chosen, we reject our Null Hypothesis.

Critical Value of X^2

The value determined by the significance level chosen

When $X^2 > \text{Critical Value}$,
we reject our Null Hypothesis, H_0 .

Degrees of freedom (df)	Significance level		
	10%	5%	1%
1	2.71	3.84	6.63
2	4.61	5.99	9.21
3	6.25	7.81	11.34
4	7.78	9.49	13.28
5	9.24	11.07	15.09
6	10.64	12.59	16.81
7	12.02	14.07	18.48
8	13.36	15.51	20.09
9	14.68	16.92	21.67
10	15.99	18.31	23.21

Example:

5% Significance Level

df = 4 (3X3 table)

Critical Value of X^2

= 9.49

H_0 rejected

if our calculated $X^2 > \text{critical value from table}$

> 9.49

Degrees of freedom (df)	Significance level		
	10%	5%	1%
1	2.71	3.84	6.63
2	4.61	5.99	9.21
3	6.25	7.81	11.34
4	7.78	9.49	13.28
5	9.24	11.07	15.09
6	10.64	12.59	16.81
7	12.02	14.07	18.48
8	13.36	15.51	20.09
9	14.68	16.92	21.67
10	15.99	18.31	23.21

Let's start the homework together:

11E.2 p. 341, # 1 - 6

3.68% < 5%
Rejects H_0

1) Given: 5% Significance Level

critical value of $X^2 = 5.99$

From contingency table: (2 rows by 3 columns)
degrees of freedom, $df = (2-1)(3-1)$
 $df = 2$, find 5.99 on critical value table p. 338

Enter contingency table values in a matrix
and calculate X^2 test (STAT menu)

Calculated $X^2 \approx 6.61$ $p \approx 0.0368$

$6.61 > 5.99$

Reject H_0

H_0 = Diabetes and Weight
are independent.

H_A = Diabetes and weight are not
independent

HW: 11E.2 p. 341, # 1 - 6

HW Quiz Tuesday

pgs. 541, 59, 62, 336, 337, 341

Quiz next Tuesday:

Normal Distribution

Correlation

X^2 Test of Independence